

CLAIMS

Having thus described the invention, what I desire to claim and secure by letters patent is:

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A user programmable remote control access system in which an encoded signal from a transmitter may be recorded as a signature control signal and without a need for the user or an installer to have a knowledge of the encoded signal and which does not require access to the interior of the transmitter or the receiver, said system comprising:

a) a portable hand-held transmitter capable of generating and transmitting a radio frequency receiver responsive signal which is digitally encoded,

b) an encoder associated with said transmitter for digitally encoding the receiver responsive encoded signal,

c) a receiver responsive to the transmitted encoded signal and generating an electrical signal representative of the encoded signal, said receiver being operable in a program mode where it is capable of having an encoded signal from a transmitter to be recorded as a signature control signal and in an operating-receiving mode where it is capable of enabling and triggering in response to receipt of a valid and verified encoded signal corresponding to a recorded signature control signal, and

d) a microprocessor control unit operatively associated with the receiver, said control unit being operable to record a signature signal from a transmitter when the receiver is operable in the program mode only requiring the transmission of the encoded signal from the transmitter for recording as a signature control signal and thereby eliminating any need for access to the interior of the transmitter or receiver and thereby removes the need of the user or installer to have knowledge of the specific signature control signal and consequently no skills are required to program the receiver and control unit, said control unit being operable in the receive mode so that it will enable a decoding of an encoded signal from a transmitter and a comparison of the decoded signal to a signature control signal which has been recorded in the control unit to determine if the decoded signal corresponds to the recorded signature control signal and thereby represents a valid code.

The remote control access system of Claim 1 further characterized in that said receiver and control unit are operable in the program mode to record many different transmitter encoded signals and encoded signals of different signal bases even when each produces completely different codes and each may have entirely different numbers of maximum combinations of available codes.

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The remote control access system of Claim 1 further characterized in that said receiver is provided with a switch to put the receiver in the program mode.

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The remote control access system of Claim 1 further characterized in that said control unit is responsive to receiving signature control signals from a plurality of transmitters when the receiver is in the program mode to have the signature control signals from each of the plurality of transmitters recorded as signature control signals, so that in the receive mode, the subsequent encoded signals from any of said plurality of transmitters are decoded and compared against the recorded signature control signals.

The remote control access system of Claim 1 further characterized in that each transmitter and encoder are capable of generating a plurality of different encoded signals.

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The remote control access system of Claim 4 further characterized in that certain of said transmitters generate encoded signals which will access only certain areas and certain other of said transmitters generate encoded signals which enable access to other areas.

A user programmable remote control access system in which a receiver and a control unit therefore are operable upon receipt of a proper transmitted encoded signal from any of a plurality of transmitters and which transmitters may be of completely different types and which may generate different types of encoded signals to arm and disarm said system, said system comprising:

a) at least one first transmitter capable of transmitting a first receiver responsive radio frequency digitally encoded signal for arming and disarming said system,

b) at least one second transmitter capable of generating and transmitting a second and different radio frequency receiver responsive digitally encoded signal for arming and disarming said system, and which at least one second transmitter is of a different type and may generate completely different types of encoded signals and where the encoded signals may have different numbers of bits,

c) a receiver remote from the transmitters and responsive to the transmitted radio frequency encoded signals and generating electrical signals corresponding to each of the respectively encoded signals, and

d) a control unit operatively associated with the receiver, said control unit decoding the generated electrical signals to generate decoded digital signals and comparing the decoded digital signals to the signature control signals which

have been previously recorded in the control unit to determine if the decoded digital signals correspond to the recorded signature control signals and thereby represent valid signals.

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The remote control access system of Claim 7 further characterized in that the receiver and control unit are operable in a program mode to record the encoded transmitted signals as signature control signals and in a receive mode to compare subsequently received transmitted signals to the recorded signature control signals.

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The remote control access system of Claim 7 further characterized in that the control unit is a microprocessor operated control unit.

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The remote control access system of Claim 8 further characterized in that the system is user programmable such that the user of any transmitter may initially record the encoded signal from that transmitter as a signature control signal in the control unit by simple actuation of the transmitter when the receiver and control unit are in a program mode, only requiring the transmission of the encoded signal from the transmitter for recording as a signature control signal and which eliminates the need of the user or installer to have knowledge of the specific signature control signal and thereby requires no skill to program the receiver and control unit.

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The remote control access system of Claim 10 further characterized in that said receiver is provided with a switch to put the receiver in the receiver mode or in the program mode.

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The remote control access system of Claim 11 further characterized in that said receiver exits the program mode automatically after a pre-established time delay.

A remote control access system in which a receiver is armed and disarmed by a radio frequency transmitted encoded signal from a remotely located transmitter and which transmitted encoded signal is not capable of being unauthorizedly derived by electronic scanning techniques even if any of the coded signals which may be generated by electronic scanning techniques do constitute a valid signal, said system comprising:

a) a transmitter capable of generating and transmitting a radio frequency receiver responsive encoded signal,

b) an encoder associated with said transmitter for encoding the receiver responsive encoded signal which is to be transmitted by the associated transmitter,

c) a receiver remote from the transmitter and responsive to the radio frequency transmitted encoded signal and generating an electrical signal representative of the encoded signal, and

d) a microprocessor-based control unit operatively associated with the receiver, said control unit comparing the decoded signal to a signature control signal which has been previously recorded in the control unit to determine if the decoded signal is a valid signal, or if the decoded signal does not correspond to the recorded signature control signal and is an invalid signal, said control unit preventing a comparison of the next successive decoded electrical signal with the signature

control signal for a time delay which is longer than the time required for the generation of two successive encoded signals by electronic scanning techniques so that even if a valid signal corresponding to a recorded signature control signal is generated immediately following an invalid signal, it will be precluded from arming or disarming the system by electronic scanning techniques.

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The remote control access system of Claim 13 further characterized in that each decoded signal which does not compare with the recorded signal starts the time delay again.

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The remote control access system of Claim 13 further characterized in that the system is user programmable without a need of anyone to have knowledge of the encoded signal or to open the transmitter used therewith.

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The remote control access system of Claim 13 further characterized in that said transmitter and encoder are capable of generating a plurality of different encoded signals.

The remote control access system of Claim 13 further characterized in that the system is operable from a plurality of transmitters to arm and disarm the system, said system comprising a plurality of transmitters and where each of said transmitters may be different from the others and have different signal bases.

The remote control access system of Claim 17 further characterized in that the signature control signals which have been previously recorded are generated from the individual hand held transmitters and encoders associated therewith and recorded in the control unit.

A user remote control access system in which a receiver is capable of generating a responsive action in the event of unauthorized intrusion in a selected environment, said system comprising:

a) a portable hand-held transmitter capable of generating and transmitting a radio frequency receiver responsive signal which is digitally encoded,

b) an encoder associated with said transmitter for encoding the receiver responsive encoded signal,

c) a receiver remote from the transmitter and responsive to the transmitted radio frequency encoded signal and generating an electrical signal representative of the encoded signal, and

d) a microprocessor-based control unit operatively associated with the receiver, said control unit decoding the generated electrical signals of at least two successive transmitted signals and generating decoded signals therefrom and comparing the decoded signals to each other and to a valid signature control signal previously recorded in the control unit to determine if the decoded signals represent valid signals, said control unit recognizing a valid signal if each of two successive encoded signals are indential to each other and also are the same as the previously recorded signature control signal and recognizing said decoded signals as invalid if they do not

compare to each other or if they do compare to each other but do not compare to the previously recorded signature control signal.

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The remote control access system of Claim 19 further characterized in that the receiver is user programmable with an encoded signal, said receiver being operable in a program mode where it is capable of having an encoded signal from a transmitter recorded as a signature control signal and in an operating-receive mode where it is capable of enabling triggering in response to receipt of a signature control signal corresponding to a recorded signature control signal.

The remote control access system of Claim 20 further characterized in that said control unit is operable to record a signature control signal from a transmitter when the receiver is operable in the program mode only requiring the transmission of the encoded signal from the transmitter for recording as a signature control signal and thereby avoiding any need for access to the interior of the transmitter and which also thereby avoids the need of the user or installer to have knowledge of the specific signature control signature and thereby avoids the need of specific skills to program the receiver and control unit, said control unit also being operable when the receiver is in the receive mode to decode the electrical signal representative of the encoded signal.

The remote control access system of Claim 21 further characterized in that said receiver and control unit are operable in the program mode to record many different transmitter encoded signals and transmitter encoded signals of different signal bases and operable in the receive mode to decode and compare many different transmitter encoded signals and many transmitter encoded signal bases of different signals against any signature control signal.

The remote control access system of Claim 19 further characterized in that said receiver is provided with a manually operable switch to put the receiver in the receive mode or in the program mode.

The remote control access system of Claim 19 further characterized in that said control unit is responsive to receiving signature control signals from a plurality of transmitters when the receiver is in the program mode to have the signature control signals from each of the plurality of transmitters recorded as signature control signals, so that in the receive mode, the subsequent encoded signals from any of said plurality of transmitters are decoded and compared against the recorded signature control signals.

A user programmable remote control access system in which a receiver and a control unit therefore are operable upon receipt of a proper transmitted encoded signal from any of a plurality of transmitters to arm and disarm the system, said system comprising:

a) at least one first transmitter capable of generating and transmitting a radio frequency receiver responsive signal which is digitally encoded,

b) at least one second transmitter capable of generating and transmitting a second and different radio frequency receiver responsive digitally encoded signal for arming and disarming said system, and which at least one second transmitter is of a different type and may generate different types of encoded signals than any such first transmitter,

c) a receiver remote from the transmitters and responsive to the transmitted encoded signal and generating electrical signals respectively representative of the encoded signals, and

d) a control unit operatively associated with the receiver, said control unit decoding the generated electrical signals to generate decoded digital signals, said control unit enabling access to a first area if the encoded signal from the first transmitter corresponds to a first recorded signature control signal, said control unit enabling access to a second

area if the encoded signal from a second transmitter corresponds to a second recorded signature control signal and is also thereby a valid signal.

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The remote control access system of Claim 25 further characterized in that said first and second transmitters may be of different types and they may generate different types of encoded signals.

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The remote control access system of Claim 25 further characterized in that the receiver and control unit are operable in a program mode to record the encoded transmitted signals as signature control signals and in a receive mode to compare subsequently received transmitted signals to the recorded signature control signals, and the signature control signals which have been previously recorded in the control unit are generated from the same individual transmitters and encoders associated therewith and recorded in the control unit when the latter are operable in the program mode.

A method of operating a user programmable remote control access system in which an encoded signal from a transmitter may be recorded as a signature control signal and which does not require knowledge of the encoded signal by the user or an installer and which does not require access to the interior of the transmitter to program the system, said method comprising:

- a) generating a receiver responsive digitally encoded signal,
- b) transmitting the generated receiver responsive encoded signal from a hand held portable transmitter,
- c) locating a receiver responsive to the transmitted encoded signal in a position to receive the transmitted signal,
- d) operating said receiver in a program mode to have a signature signal of a transmitter to be encoded,
- e) generating an electrical signal at the receiver which is representative of the encoded signal,
- f) decoding the electrical signal to provide a decoded signal,
- g) recording the decoded signal as a signature control signal when the receiver is operable in the program mode only requiring the transmission of the encoded signal from the transmitter for recording as a signature control signal thereby avoiding any need for access to the interior of the transmitter and which also thereby avoids the need of the user or installer

to have knowledge of the specific signature control signal and thereby avoid the need of specific skills to program the receiver, and

h) operating said control unit in a receive mode to decode further electrical signals representative of the encoded signals and compare the decoded signals to the recorded signature control signal, to determine if the decoded signal corresponds to the recorded signature control signal and thereby represents a valid signal, or if the decoded signal does not correspond to the recorded control signal and thereby represents an invalid signal, such that the user never has to know the specific encoded control signal.

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